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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/005,193	12/04/2001	Trista P. Chen	200302024-1	6949

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IP Administration, Legal Dept. M/S 35
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EXAMINER	
EHICHIOYA, FRED I	

ART UNIT	PAPER NUMBER
2162	

DATE MAILED: 06/17/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/005,193	CHEN ET AL.	
	Examiner	Art Unit	
	Fred I. Ehichioya	2162	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *23 May 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1 - 5, 7 - 10, 18 - 21, 36, 38 - 40, and 42 - 43* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1 - 5, 7 - 10, 18 - 21, 36, 38 - 40, and 42 - 43* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. This action is responsive to communications: RCE filed May 23, 2005 to the original application filed 12/04/2001.

2. Claims 1 – 5, 7 – 10, 18 – 21, 36, 38 – 40, and 42 - 43 are pending.

3. Claims 6, 37 and 41 are canceled.

4. Claims 11 – 17 and 22 – 35 are withdrawn.

Continued Examination Under 37 CFR 1.114

5. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 05/23/2005 has been entered.

Response to Arguments/Remarks

6. Applicants' argue:

(a) "Bracewell teaches applications for Fourier transforms. Bracewell, however does not teach using Fourier-Mellin Transforms to compute a match descriptor for images" (page 10, paragraph 5).

(b) "Nowhere does Broder teach or suggest using the mathematical notations for images, Instead, Broder teaches using such mathematical notations for documents" (page 11, paragraph 2).

In response to argument (a), Examiner respectfully disagrees with the applicants. Gotze discloses using Fourier-Mellin Transforms to compute a match descriptor for images as shown on page 879, section 2.2.

In response to argument (b), that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., using the mathematical notations for images) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

However, Broder discloses set similarity measure between A and B as the ratio of the number of elements common to the two sets as shown on page 23, paragraph 2 "once we fix ....., etc".

Claim Rejections - 35 USC § 101

7. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

8. Claims 18 and 42 is rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

A process that merely manipulates an abstract idea or performs a purely mathematical algorithm is nonstatutory, despite the fact that it might inherently have some usefulness, Sarkar, 588 F.2d at 1335, 200 USPQ at 139. For such subject matter to be statutory, the claimed must be limited to a practical application of the abstract idea or mathematical algorithm in the technological arts, Alappat, 33 F.3d at 1543, 31 USPQ2d at 1556-57.

In practical terms, claims define nonstatutory processes if they simply manipulate abstract ideas, e.g., a bid or a bubble hierarchy, without some claimed practical application, Schrader, 22 F.3d at 293-94, 30 USPQ2d at 1458-59; Warmerdam, 33 F.3d at 1360, 31 USPQ2d at 1759.

Regarding claim 18, that recites "a method for storing and retrieving image data" merely manipulate an abstract idea, and hence nonstatutory because it does not represent a practical application of the idea.

Regarding claim 42 that recites "a method of software execution for storing and ordering image data" is directed to a mere program listing, i.e., to only its description or expression, it is descriptive material per se and hence nonstatutory. (MPEP 2106 IV.B.1 (a)).

The dependent claims also inherit these deficiencies and therefore, rejected under 35 U.S.C. 101 since they are also directed to nonstatutory subject matter.

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

10. Claims 1 – 5, 7, 18 - 21, 36, 39, 42 and 43 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 6,754,667 issued to Whoi-Yul Kim et al (hereinafter "Kim") in view of Non-Patent Literature Invariant content-based Image Retrieval Using a Complete set of Fourier-Mellin Descriptors issued to Derrode et al (hereinafter "Derrode") and further in view of U.S. Patent 6,598,054 issued to Hinrich Schuetze et al (hereinafter "Schuetze").

Regarding claim 1, Kim teaches a method of storing and ordering image data in a database comprising:

gathering a plurality of images for inclusion in the database (see column 3, lines 50 – 53);

a match descriptor indicative of each of the plurality of images (see column 3, lines 53 – 57),

organizing the match descriptors in the database„ the organizing being performed according to a predetermined metric indicative of a correspondence between a given match descriptor and the other match descriptors in the database (column 6, lines 8 – 20),

Kim does not explicitly teach computing by a Fourier-Mellin Transform (EMT), a multidimensional space having more than two dimensions; and

wherein the predetermined metric defines a ratio of a number of elements common to two sets and a total number of unique elements in the two sets as claimed.

However, Derrode teaches computing by a Fourier-Mellin Transform (FMT) (see page 878, section 2 and page 879, section 2.2); and

wherein the predetermined metric defines a ratio of a number of elements common to two sets and a total number of unique elements in the two sets (see page 878, section 2.1: It should be noted that applicants disclose on page 9 of the specification that Intersection similarity metric is given A and B, the set similarity measure between A and B is the ratio of the number of elements common to the two

sets and the total number of unique elements in the two sets; this can be equated to the disclosure of Derrode on page 879 "the intersection ... M=128).

Schuetze teaches each of the match descriptors corresponding to a multidimensional space having more than two dimensions (see column 24, line 65 – column 25, line 4).

It would have been obvious to one of ordinary skill in the data processing art at the time of the present invention to combine teaching of the cited references because Derrode's teaching of "computing a match descriptor corresponding to a multidimensional space indicative of each of the match images" would have allowed Kim's system to complete invariant set to store and encode complex gray-level shapes as suggested by Derrode (see Conclusion).

Further, Schuetze's system would have allowed Kim and Derrode's system to set forth a framework for multi-modal browsing and clustering. This framework enhances browsing, searching, retrieving and recommending contents in a collection of documents as suggested by Schuetze at column 5, lines 45 – 60.

Regarding claim 2, Kim teaches a match descriptor is a vector quantity (see column 4, lines 62 – 63).

Regarding claim 3, Kim teaches the correspondence is a similarity of the match descriptors (see column 3, lines 6 – 9).

Regarding claim 4, Schuetze teaches the predetermined metric is a distance metric (see column 16, lines 28 - 29).

Regarding claim 5, Kim teaches the distance metric is derived from a similarity metric, the similarity metric operable to determine match descriptors near to other match descriptors based on a distance in the multidimensional space (see column6, lines 8 – 20).

Regarding claim 7, Schuetze teaches vector quantization of the FMT (see column 16, lines 62 - 65).

Regarding claim 18, Kim teaches a method for storing and retrieving image data comprising;

providing a plurality of match images (see column 3, lines 50 – 53);

a match descriptor indicative of each of the match images (see column 3, lines 53 – 57)

organizing each of the match descriptors in a database according to a predetermined similarity metric, the similarity metric operable to indicate match descriptors that are near to other match descriptors (see column 6, line 8 – 20) in the multidimensional space (see Schuetze: column 24, line 65 – column 25, line 4);

receiving a target image for which a match is sought (see column 6, lines 32 – 33);

computing a target descriptor indicative of the target image (see column 6, lines 33 – 36);

mapping into the database to determine a close match of the target descriptor among the organized match descriptors, a close match determined by a distance to a near match descriptor within a predetermined threshold, the mapping further comprising (see column 3, line 63 – column 4, line 5):

selecting a candidate match descriptor from among the organized match descriptors (see column 4, lines 5 – 9); and

returning the candidate match descriptor if the candidate match descriptor is a match to the target descriptor (see column 3, line 63 – column 4, line 5),

Kim does not explicitly teach computing.-by a Fourier-Mellin Transform TMT), a multidimensional space; and the match being determined by a similarity metric, wherein the predetermined similarity metric defines a ratio of a number of elements common to two sets and a total number of unique elements in the two sets.

However, Derrode teaches computing.-by a Fourier-Mellin Transform TMT) (see page 878, section 2 and page 879, section 2.2.),

wherein the predetermined metric defines a ratio of a number of elements common to two sets and a total number of unique elements in the two sets (see page 878, section 2.1: It should be noted that applicants disclose on page 9 of the specification that Intersection similarity metric is given A and B, the set similarity measure between A and B is the ratio of the number of elements common to the two

sets and the total number of unique elements in the two sets; this can be equated to the disclosure of Derrode on page 879 "the intersection ... M=128).

Schuetze teaches a multidimensional space (see column 24, line 65 – column 25, line 4);

the match being determined by a similarity metric (see column 20, lines 41 – 47 and column 23, lines 51 – 56).

It would have been obvious to one of ordinary skill in the data processing art at the time of the present invention to combine teaching of the cited references because Derrode's teaching of "computing a match descriptor corresponding to a multidimensional space indicative of each of the match images" would have allowed Kim's system to complete invariant set to store and encode complex gray-level shapes as suggested by Derrode (see Conclusion).

Further, Schuetze's system would have allowed Kim and Derrode's system to set forth a framework for multi-modal browsing and clustering. This framework enhances browsing, searching, retrieving and recommending contents in a collection of documents as suggested by Schuetze at column 5, lines 45 – 60.

Regarding claim 19, Kim teaches selecting another candidate match descriptor if the candidate match descriptor is not a match to the target descriptor, the selecting occurring from among match descriptors organized near the candidate match descriptors (see column 2, lines 44 – 53).

Regarding claim 20, Kim teaches wherein near match descriptors are similar vectors in the multidimensional space (see column 6, lines 8 – 20).

Regarding claim 21, Kim teaches the similarity metric is a set similarity metric (see column 6, lines 8 – 20).

Regarding claim 36, Schuetze teaches wherein the predetermined metric is a distance metric that is derived from a similarity metric, the similarity metric defines a similarity between match descriptors that define images in terms of exclusion of attributes (see column 11, lines 34 – 42 and column 16, lines 27 – 61).

Regarding claim 39, Schuetze teaches wherein the multidimensional space has more than two dimensions (see column 15, lines 41 – 44).

Regarding claim 40, Schuetze teaches wherein the similarity metric defines a similarity between match descriptors and the target descriptor that defines images in terms of exclusion of attributes (see column 9, line 65 – column 10, line 4 and column 19, lines 3 – 53).

Regarding claim 42, Kim teaches a method of software execution for storing and ordering image data, comprising:

organizing the descriptors by applying a similarity metric to measure a difference between two images (see column 6, lines 8 – 20).

Kim does not explicitly teach dividing each image of plural images into plural regions;

computing, by a Fourier-Meillin Transform (FMT) for each region, a descriptor that correspond to multidimensional space having more than two dimensions; and

wherein the difference between two different sets of descriptors is a ratio of *a* number of elements common to the two sets and a total number of unique elements in the two sets.

However, Derrode teaches computing, by a Fourier-Meillin Transform (FMT) for each region, a descriptor (see page 878, section 2 and page 879, section 2.2,

wherein the difference between two different sets of descriptors is a ratio of *a* number of elements common to the two sets and a total number of unique elements in the two sets (see page 878, section 2.1).

Schuetze teaches dividing each image of plural images into plural regions (see column 24, lines 58 – 59);

that correspond to multidimensional space having more than two dimensions (see column 24, line 65 – column 25, line 4).

It would have been obvious to one of ordinary skill in the data processing art at the time of the present invention to combine teaching of the cited references because

Derrode's teaching of "computing a match descriptor corresponding to a multidimensional space indicative of each of the match images" would have allowed Kim's system to complete invariant set to store and encode complex gray-level shapes as suggested by Derrode (see Conclusion).

Further, Schuetze's system would have allowed Kim and Derrode's system to set forth a framework for multi-modal browsing and clustering. This framework enhances browsing, searching, retrieving and recommending contents in a collection of documents as suggested by Schuetze at column 5, lines 45 – 60.

Regarding claim 43, Kim, Derrode teach the claimed subject matter as discussed in claim 42.

However, Derrode teaches computing, by the FMT, a target descriptor for a target Image (see page 878, section 2 and page 879, section 2.2);

Schuetze teaches using the similarity metric to determine similarity between the target descriptor and at least one candidate descriptor from the descriptors (see column 20, lines 41 – 47 and column 23, lines 51 – 56).

It would have been obvious to one of ordinary skill in the data processing art at the time of the present invention to combine teaching of the cited references because Derrode's teaching of "computing a match descriptor corresponding to a multidimensional space indicative of each of the match images" would have allowed Kim's system to complete invariant set to store and encode complex gray-level shapes as suggested by Derrode (see Conclusion).

Further, Schuetze's system would have allowed Kim and Derrode's system to set forth a framework for multi-modal browsing and clustering. This framework enhances browsing, searching, retrieving and recommending contents in a collection of documents as suggested by Schuetze at column 5, lines 45 – 60.

11. Claims 8 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kim in view of Derrode, Schuetze and further in view of U.S Patent 6,751,343 issued to Regina K. Ferrell et al (hereinafter "Ferrell").

Regarding claim 8, Kim, Derrode and Schuetze teach the claimed subject matter as discussed in claim 1.

However, Ferrell teaches the match descriptors are invariant descriptors (see column 7, lines 42 – 43).

It would have been obvious to one of ordinary skill in the data processing art at the time of the present invention to combine teaching of the cited references because Ferrell's teaching of "the match descriptors are invariant descriptors" would have allowed Kim, Derrode and Schuetze's system for indexing and retrieving manufacturing-specific digital imagery based on image content in accordance with the inventive arrangement satisfies the long-felt need of the prior art by providing manufacturing-specific, context based image retrieval in an industrial environment. as suggested by Ferrell (see Summary).

Regarding claim 9, Ferrell teaches the invariant descriptors are insensitive to geometric translations (see column 7, lines 43 – 67).

12. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kim in view of Derrode, Schuetze and further in view of Non-Patent Literature "Similarity search in High Dimensions via Hashing," Proceedings of the 25th VLDB (Very Large Database) Conference, Edinburgh, Scotland, (1999) By Gionis, A. et al (hereinafter "Gionis").

Regarding claim 10 Kim, Derrode and Schuetze teach the claimed subject matter as discussed in claim 1.

Kim, Derrode or Schuetze does not teach Locality-Sensitive Hashing (LSH).

Gionis teaches the organizing according to a predetermined metric further comprises Locality-Sensitive Hashing (LSH) (see sections 3.1 and 3.2).

It would have been obvious to one of ordinary skill in the data processing art at the time of the present invention to combine teaching of the cited references because Gionis's teaching of "the organizing according to a predetermined metric further comprises Locality-Sensitive Hashing (LSH)" would have allowed Kim, Derrode and Schuetze's system to essentially determine in advance its running time. This property makes LSH a suitable candidate for high-performance and real-time system as suggested by Gionis (see Conclusion).

13. Claim 38 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kim in view of Derrode, Schuetze and further in view of Non-Patent Literature "On the resemblance and containment of documents", IEEE Computer society pp. 21 – 29 (1998) by Broder, A.Z. (hereinafter "Broder").

Regarding claim 38, Kim, Derrode and Schuetze teach the claimed subject matter as discussed in claim 1.

Kim, Derrode or Schuetze does not teach wherein given two different descriptors A and B with a distance D between two images, the set intersection metric is D (A, B) = $|A \cap B| \div |A \cup B|$.

However, Broder teaches wherein given two different descriptors A and B with a distance D between two images, the set intersection metric is D (A, B) = $|A \cap B| \div |A \cup B|$ (see page 24, section 3).

It would have been obvious to one of ordinary skill in the data processing art at the time of the present invention to combine teaching of the cited references because Broder's teaching of "wherein given two different descriptors A and B with a distance D between two images, the set intersection metric is D (A, B) = $|A \cap B| \div |A \cup B|$" would have allowed Kim, Derrode and Schuetze's system to reduce issues of set intersection problems that can be easily evaluated by a process of random sampling that can be done independently for each document as suggested by Broder at page 21 (Abstract).

Conclusion

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Fred I. Ehichioya whose telephone number is 571-272-4034. The examiner can normally be reached on M - F 8:00 AM to 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John E. Breene can be reached on 571-272-4107. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Fred I. Ehichioya
Patent Examiner
Art Unit 2162

June 12, 2005

SHAHID ALAM
PRIMARY EXAMINER